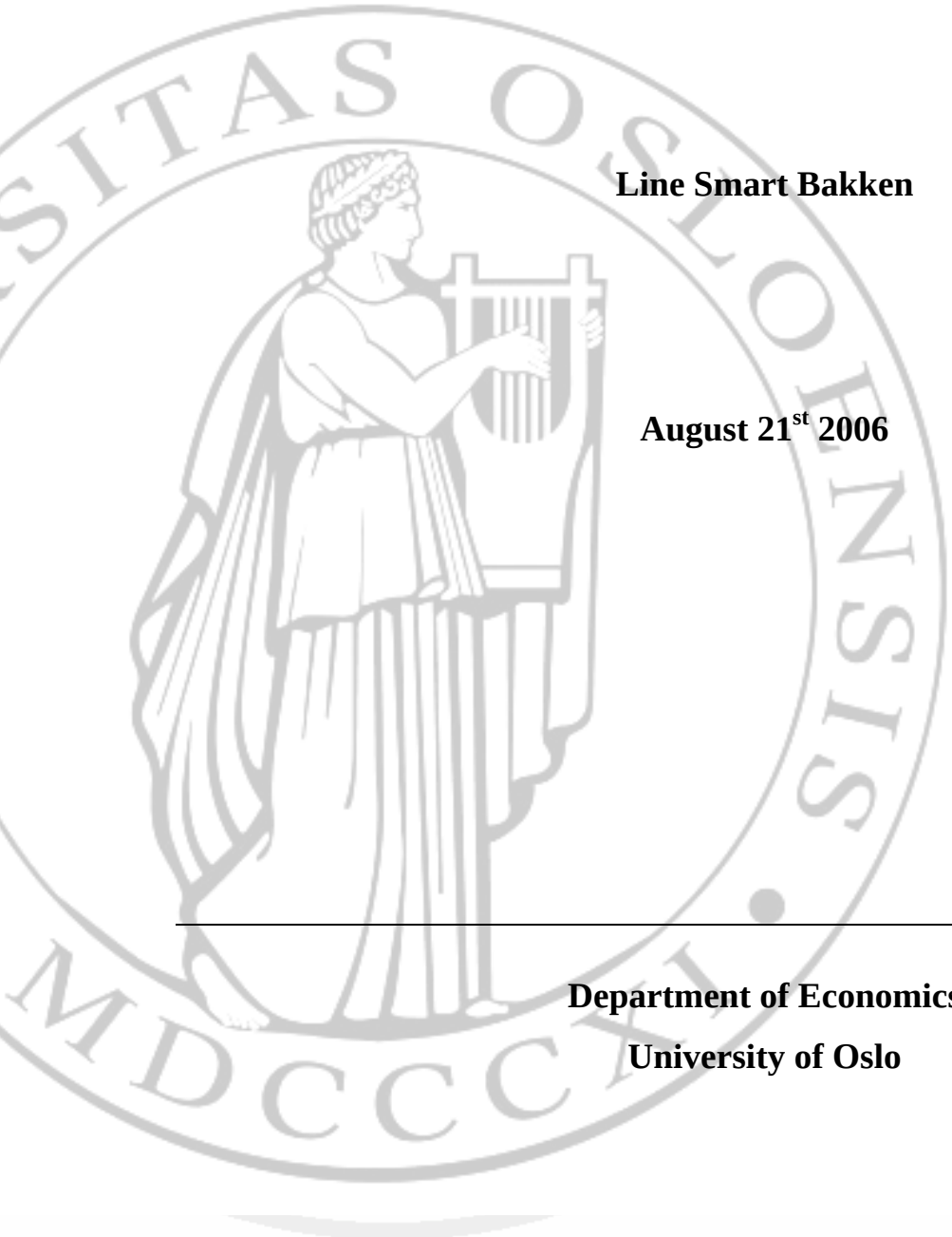
Master thesis for the Master of Economic Theory and Econometrics degree

# The Golden Age of Retirement

*Income, consumption and savings for retirement age Norwegian households.*



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# Preface

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## Abstract[1]

The aim of this paper is to investigate income, saving and consumption for households around retirement age. When doing this, there are different objectives which can be analyzed. First of all it is possible to get some insight of welfare of elderly when they reach retirement. Second, it is interesting to check the predictions of the life-cycle model by investigating consumption trends of households. Register data files are used to construct households which are used in the analysis throughout the paper. Modeling was done for a particular group of Norwegian households who were tracked through their retirement transition period. For each household there are characterizations such as pension income, labor income, wealth accumulation, saving and consumption. The results show that the households increase their after tax income and consumption, and have a high level of net financial wealth. In addition is a connection between high income replacement ratio and low income before retirement found. Households who have high income replacement ratios increase consumption more than households with low income replacement. The results also suggest that retirement decisions are independent of other decision making such as consumption and saving



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[1] This paper/master thesis was written within the Frisch Centre project 1133 (Working Life and Welfare of the Elderly). We acknowledge financing from the Research council of Norway.

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# 1. Introduction

This paper investigates income and consumer behavior among elderly Norwegians. Analyzing consumer behavior at retirement is important for a number of reasons; the demographic situation of many countries, as in Norway, is characterized by a growing elderly population[2]. It is therefore imperative to devote time to study effects of this situation. Studying consumption of the elderly allows the direct estimation of how well Social Security retirement benefits meet one of the main goals of the program: the maintenance of consumption. A reform of the retirement scheme is planned in Norway[3], and analyzing decision making at retirement can add some new insight as to how well off the elderly in Norway are. In addition, it is of substantial interest to test the predictions of the life-cycle model in order to answer fundamental questions on how households make economic decisions about the future.

The text book version of the life-cycle model predicts a smoothed consumption path over the life cycle, and therefore consumption should be constant over the span of life. It's assumed on that people will save in periods when their income is high relatively to average, and the opposite when income is relatively low. Consumption should be constant and the behavior of people in the model is based on expectations of future income not present income. People expect a drop in income at retirement with an income higher than consumption before retirement, and income lower than consumption after retirement. People save to order to consume in the future.

The key ideas of the life-cycle hypothesis come from the work of Modigliani and Brumberg (1954) and Friedman (1957). The model is the standard model for the analysis of inter-temporal decision making at the household level. There has however been a great deal of work done in the analysis of possible limitations of this model. Many researchers find the model useful, but have also had difficulties reconciling the model with empirical findings.

Common for studies analyzing spending at retirement, is that a significant decline of individuals/households consumption at retirement age is observed. This decline is associated with a reduction in income and can be interpreted as an indicator for inadequate resources at retirement resulting in reduced consumption. However, it might also be evidence of inadequate financial preparations for retirement. The decline can not be explained by the

[2] http://www.ssb.no/samfunnsspeilet/utg/200401/01/art-2004-03-04-01.html, http://www.ssb.no/folkfram/
[3] http://www.pensjonsreform.no/english.asp?id=22#m

life-cycle model, since the life-cycle model predicts constant consumption. This phenomenon is called the retirement-consumption puzzle and has been the topic of a number of investigative studies. In the US, Hamermesh (1984) utilized the life-cycle model to examine 500 Caucasian, married couples and concluded that average consumption exceeds 14 percent of the total income in their retirement years. He concludes that saving for retirement is insufficient to sustain the level of consumption.

A number of other studies try to make new assumptions and versions of the life-cycle model in order to attempt to reconcile with the puzzle. Haider and Stephens Jr. (2004) argue that subjective expectations should be utilized instead of rational expectations in the life-cycle framework. They find that retirement expectations are significantly correlated with consumption changes. When using retirement expectations as an instrument for retirement, they find that consumption falls by 7 to 11 percent for workers who retire as expected. Hurd and Rohwedder (2003) investigated the puzzle by comparing anticipated and actual declines in spending at retirement. They use a non separable utility function in leisure and consumption. They found that a change in consumption comes as no surprise to most people when they retire. The average anticipated decline is larger than the actual decline. They also suggest that people might be more worried about the level of income which is anticipated at retirement age, instead of the level of consumption. Laitner and Silverman (2005) also use a non separable utility function in consumption and leisure and discrete work choices to specify a life-cycle model with these elements. They estimate different parameters in the model and most important the inter-temporal elasticity of substitution. The results show that whether consumption and leisure are substitutes or complementary determines whether people wish to increase or decrease consumption when leisure increase.

Schwerdt (2005) used German data and concluded that the drop in consumption is mainly found in the low income replacement group, where the drop is more than 30 percent, while the high income replacement group has an increase in consumption by more than 10 percent. The study therefore suggests that the fall in consumption differs between income replacement groups, and that the fall is not observed for all groups.

The aim of this paper is to analyze consumption- and income paths of the retired population, and to determine to what extent the life-cycle model fits the data for Norway.

Modeling was done for a particular group of Norwegian households that was tracked through their retirement transition period. For each household we observe pension income, labor income, wealth accumulation, saving and consumption. Each household contains one individual from the 1934 cohort. Data has it’s origin in different register files where each

individual had a personal identification number code. The code makes it possible to link spouses and families together. The utilized files come from the tax offices and official registers containing demographic information. Data construction and programming was done in SAS system for Windows (Version 9).

The results show that the households analyzed increase their after tax income and consumption after one spouse has retired, and moreover they have a high level of net financial wealth. In addition it is found a connection between having a high income replacement ratio and having a low income before retirement, and those households who have high income replacement ratio increase consumption more than the households who have low income replacement ratio and a high income before retirement. The results also suggest that retirement decisions are independent of other decision making such as consumption and saving, since a high degree of early retirement and disabled are found in the sample analyzed at the same time as income and consumption is increasing for the sample. Independent of retirement behavior are people able to sustain their welfare.

The rest of this paper is organized as follows: Chapter 2 presents the theoretical modeling approach; Chapter 3 gives a description of the data sample and the construction of the variables, in addition can some institutional settings be found in this chapter; Chapter 4 presents the analysis, and chapter 5 concludes.

# 2. Theory

The Life Cycle model is frequently utilized in studying saving and consumption behavior at retirement. The model serves as a basic framework for analyzing the inter-temporal behavior over the whole period of life as well as in particular intervals.

I will present the basic text book model and implications. The model is a good reference point for the further analysis in this paper. In this model, an individual lives for T periods and has a lifetime utility:

(1) $$U = \sum_{t=0}^{T} u(C_t), \quad u'(\bullet) > 0, \quad u''(\bullet) < 0,$$

(2) $$u(C_t) = \frac{C_t^{1-\theta}}{1-\theta}$$

Equation (2) is the instantaneous utility function dependent on consumption at age t, $C_t$. Choosing this type of utility function was done because of the special features it has, but in practice could any utility function been utilized in the model. One special feature of the function is that it has constant-relative-risk-aversion (CRRA). The reason for this name is that the coefficient of relative risk aversion (defined as –Cu''(C) / u'(C)) for this function is $\theta$, and thus independent of C. $\theta$ also measures the individual's willingness to shift consumption between two periods, the inter-temporal level of substitution, or in other words; the intertemporal elasticity of substitution. One other special feature of this function is worth mentioning; when $\theta \to 1$, the instantaneous utility function simplifies to $\ln C$, which is quite useful.

Over the life time, it is assumed that people choose the sequence of $C_t$ to solve the following optimization problem

$$\max_{\{C_t\}} V = \sum_{t=1}^{T} \frac{C_t^{1-\theta}}{1-\theta}(1+\delta)^{-t}$$

(3) Subject to

$$\sum_{t=1}^{T} C_t (1+r)^{-t} = A_0 + \sum_{t=1}^{T} Y_t (1+r)^{-t}$$

The household has some level of initial wealth $A_0$ and income from labor $Y_t$. There are T periods in each individual's life, and the stream of life-time incomes is $Y_1, Y_2, ....., Y_T$, which the individual takes as given. $\delta$ is the individual's time preference parameter and r is the real interest rate.

Maximization of (3) yields:

$$C_t = \left( A_0 + \sum_{t=1}^{T} Y_t (1+r)^{-t} \right) \left\{ \left( \frac{1+r}{1+\delta} \right)^{\frac{t}{\theta}} \Bigg/ \sum_{t=1}^{T} \frac{(1+r)^{\frac{t}{\theta}-t}}{(1+\delta)^{\frac{t}{\theta}}} \right\} \tag{4}$$

Equation (4) is essential; it tells us that consumption in each period is determined by the individuals total lifetime resources which is a fraction of the sum of life time earnings. This fraction will increase over time if $r > \delta$, since the return on savings then outweighs the discounted value of utility streams. This means that a hypothetical decrease in consumption in some period, period t, is accompanied by an increase in consumption in the next period by 1+r times the amount of decrease. Optimization requires that a marginal change of this type has no effect on lifetime utility, in other words must the marginal utilities between two periods equal each other. Since the marginal utilities of consumption in periods t and t+1 are $C_t^{-\theta} / (1+\delta)^t$ and $C_{t+1}^{-\theta} / (1+\delta)^{t+1}$, the optimization condition can be rearranged to be

$$\frac{C_{t+1}}{C_t} = \left( \frac{1+r}{1+\delta} \right)^{\frac{1}{\theta}} \tag{5}$$

This expression defines the relative change in consumption from one period to the next. The interest rate, discount rate and $\theta$ determines the change. In macro-equilibrium it can be argued that $r = \delta$. In that case will $C_{t+1} = C_t = C$.

The consumption level in each period is not determined by income in that particular period, but by income over his or her entire lifetime, and the individual divides his or her lifetime resources equally among each period of life. This is a key element of the life-cycle model.

One other key element of the model is the implication for the pattern of saving. Saving is the difference between income and consumption:

$$S_t = Y_t - C_t$$

(7)
$$S_t = Y_t - \left( A_0 + \sum_{t=1}^{T} Y_t (1+r)^{-t} \right) \left\{ \left( \frac{1+r}{1+\delta} \right)^{\frac{t}{\theta}} \Bigg/ \sum_{t=1}^{T} \frac{(1+r)^{\frac{t}{\theta}-t}}{(1+\delta)^{\frac{t}{\theta}}} \right\}$$

Thus, saving is high when income is high relative to its average. Similarly, when current income is lower than permanent income, saving is negative. The expression in the small bracket in expression (7), is the sum of the discounted life time income. The individual uses saving as a tool to smooth the consumption path over the lifetime. This implication gives us some insight about saving; we save so as to be able to consume our optimal level in the future. The model predicts borrowing prior to labor market entry, wealth accumulation during the working life, and non-saving in retirement. Therefore there should be a constant level of consumption, which is sustained by borrowing and saving, across all stages of life.

This simple one-good model of life-cycle consumption requires 'consumption-smoothing'. In this model, the shape of the consumption path is determined by the utility function parameters, interest rate and risk. The level of the path is determined by the budget constraint.

In the further analysis in this paper, the real interest rate and the discount rate are assumed to be equal. This is to make the analysis as simple as possible, and by looking at expression (5) we then get a relative consumption increase which is equal to one. In other words, we get no change in consumption from one period to the next one.

A more general model which recognizes uncertainty can cause a path of consumption which is not constant in time. For example, consumption should be reduced if retirement occurs sooner than expected since the lifetime earnings will be less than expected. Such an event could be the result of a stochastic health event. A second generalization of the model, which also can explain a consumption path not constant in time, specifies that utility depends not only on consumption, but on leisure as well. Implications for the level of consumption will then depend on whether the utility function is separable or non separable. If the function is separable, marginal utility of consumption should still be constant and hence consumption also constant in time. If I assume the non separable utility function

(8)
$$u(c, l)$$

(9) $$\left.\frac{dc}{dl}\right|_{u_c} = -\frac{u_{cl}}{u_{cc}}$$

Because $u_{cc} < 0$, $\frac{dc}{dl}$ will have the same sign as $u_{cl}$. If utility is a non-separable function, the sign depends on the relation between consumption and leisure. If consumption and leisure are complementary, more leisure (consumption) raises the marginal product of consumption (leisure). Then $u_{cl} > 0$, and the household desires to increase consumption at retirement (and after) to take advantage of the increased marginal utility of consumption that derives from higher leisure. If consumption and leisure are substitutes, $u_{cl} < 0$ an increase in leisure will lead to a decrease in consumption. It is an empirical matter what the sign of $u_{cl}$ is. The introduction of a non separable utility function could explain consumption changes at retirement, either reduction of consumption if consumption and leisure are substitutes or an increase of consumption if consumption and leisure are complimentary goods.

# 3. Data description

## 3.1 Description of data covering target population

To examine consumption and savings trends of elderly in Norway I have utilized register data files. The files have information on Norwegian families' income and wealth which is reported each year to the Norwegian Bureau of Internal Revenue (skatteetaten). Information in the data files can therefore be viewed as highly accurate since it is illegal to give false information on personal earnings. The data used here has been extracted from these reports. Each family and individual in the family has a unique identification number which makes it possible to track families and people over time.

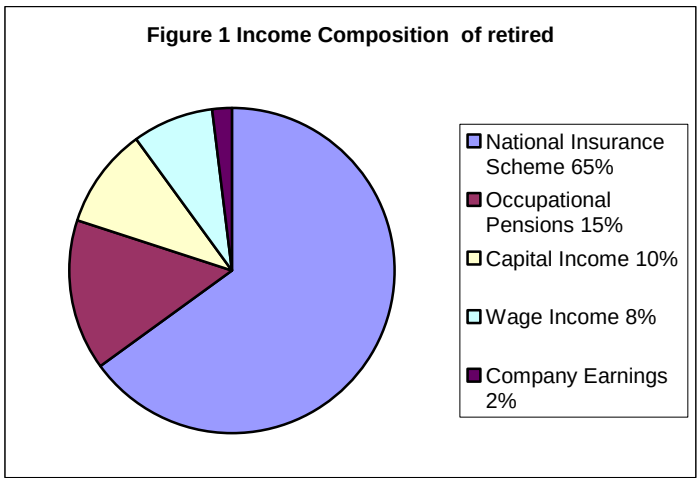
The first objective is to create households from a certain cohort, and decide which time period to follow them. Individuals born in 1934 were chosen. The whole birth cohort sample was comprised of 31397 individuals. However, following only individuals can be problematic when analyzing income as most decisions such as consumption- and saving decisions are made at a household level, and most people live in a household. In addition, many females in this cohort may have experienced their first yearly income when they received their pension. This was mainly due to the fact that they had been homemakers with the household depending on the income of the husband. These women experienced a large income jump when they retired which can give an incorrect picture of income change in the transition period at retirement. As such, it is preferred to analyze households. Of the sample, few married couples were both from the same cohort year. Therefore two sets of data were constructed defined by gender with the criteria - born in 1934. In either set, the partner could be from any other cohort. Married people were chosen by civil status, but the sets also included couples not "legally" married but living and having children together. The cohort was tracked from 1999 to 2003. By doing so, we can analyze behavior two years prior to and two years after retirement as the head of the household was 67 in 2001. This particular year was chosen since it is the official retirement year for people in Norway, and changes in income are likely to occur in this year since the national pension will be paid out that particular year. One other reason to choose this year is that Schwerdt (2005) does the same thing by using German data, and it can be of interest to replicate some of his work by using Norwegian data.

Demographic data files contain information on household status and other characteristics such as education. Households have a family ID number and ID number for both persons in the household. The target data set was constructed by merging income data, wealth data and demographic data by the ID numbers. The data set with female from the cohort had 9898 observations, and will be called *the female headed households*. Likewise is the data set with male from the cohort, called *the male headed households*. The male headed households had 11048 observations. There may be some overlapping in these two data sets, but not significant amounts since, as stated before, very few couples were comprised of individuals from the same cohort. The purpose of tracking both sets of households is to observe any differences. The timing of retirement can also be an issue since retirement of the husband often comes before the wife due to age differences.

## 3.2 Description of variables and some institutional settings

Household **income** has different sources; pension giving income, earnings from company (næringsinntekt) and pension income. The pension giving income is related to labor income as individuals earn points in the state National Insurance Scheme (NIS)[4], hence the name. State Internal Revenue files give information about the different parts of income, but not of capital income. However this has no huge effect on the analysis, since, as can be seen in Figure 1, capital income consists of only 10 percent of retiree's income. Including capital income would only give a higher level of income for the households, and it is not expected that the capital income change much during the retirement transition period. Using capital income in the analysis would not significantly change the results found in this paper.

**Figure 1 Income Composition of retired**

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[4] http://odin.dep.no/filarkiv/276755/Trygdebrosjyre_engelsk_-_2006_final.doc
[5] Statistics Norway, Sjølvmeldingsstatistikk 1996

The Pension income in Norway can come from different sources: NIS pension, early retirement pension and occupational pension.

The retirement age in Norway is 67 years[6]. However if the insured person continues to work until the age of 70, pension points can be earned. Old –age pension consists of a basic pension and a special supplement. The basic pension is calculated on the basis of the insurance period, and a full insurance requires a period of minimum 40 years. If the period is shorter, the basic pension will be reduced proportionally. As a starting point, a full basic pension equals 100 percent of the basic amount (NOK 56 861 in 2003)[7]. The basic amount is changed each year according to the yearly wage and price changes. The full basic pension for pensioner couples is 85 percent of the sum of the basic amount for each of the pensioners. The supplementary pension scheme was also introduced in 1967. The aim of the scheme is to prevent a marked decline in the standard of living upon retirement. A person is entitled to a supplementary pension if his/her annual income exceeded the average basic amount of any year for the three years after 1966. Full pension points are given for income up to 6 basic amounts (8 basic amounts before July 1st 1992). Further is 1/3 of income between 6 and 12 basic amounts credited as pensionable income. Income exceeding 12 basic amounts is disregarded. Pension points are computed for each calendar year by dividing the income for pension accruement up to 6 basic amounts (8 basic amounts before July 1st 1992) minus one basic amount, with the basic amount. Income between 6 and 12 basic amounts (before 1992 between 8 and 12) is divided by 3 basic amounts. A full annual supplementary pension is 42 percent (45 percent before 1992) (supplementary pension percentage) of the amount which appears when the current basic amount is multiplied by the average pension point figure for the person's twenty best income years (final pension point).

Example: if pensionalble income was six times the average basic amount in 2003:

$$\frac{6 * NOK\,56861 - NOK\,56861}{NOK\,56861} = 5 \text{ Pension points}$$

Example: with a final pension point figure of 7, the supplementary pension could in 2003 be:

$$\frac{NOK\,56861 * 7 * 45 * 29}{100 * 40} + \frac{NOK\,56861 * 7 * 42 * 11}{100 * 40} = NOK\,175828$$

[6] The National Insurance Scheme in Norway http://odin.dep.no/aid/norsk/tema/trygdepolitikk/bn.html
[7] http://www.skatteetaten.no/Templates/TabellerOgSatser.aspx?id=8552&epslanguage=NO

If the average pension accruement is between 6 and 12 basic amounts, the supplementary pension is 14 percent (15 percent before 1992) of the earnings. This division is to be able to have redistribution in the pension scheme. The maximum supplementary pension that can be granted is NOK 227 530. Many elderly people have had no possibilities of earning a full supplementary pension since they might have started their working life prior to 1967. In consequence, special transitional provisions have been introduced regarding people born before 1937. A person born in one of the years 1918-1936 is entitled to a full supplementary pension, provided that he\she has earned pension points each year from1967 to the year when his\her 69$^{th}$ birthday.

The early retirement (AFP) scheme covering early retirement is a private agreement between employers and representatives of employees (unions). It is financed entirely by the employer in the public sector, entirely by the employer before the age of 64 in the private sector, and 60/40 by employers and the government after that age. The AFP scheme was introduced in 1989 in the private sector. The aim was to give a decent retirement income as from age 65 for people who had left school relatively young, and who had worked ever since, often in arduous jobs, and whose life expectancy at 65 was probably lower than the average. Over the years, though, its coverage has greatly expanded, and entry age to the scheme is now down to 62 years (result of union bargaining in 1998). Table 1 gives an overview of the development of the minimum ages in the scheme, and in nine years the minimum age has been reduced by 4 years.

**Table 1. Minimum retirement ages in the AFP scheme**

| Period | Minimum age |
|---|---|
| 01.01.89 | 66 years |
| 01.01.90 | 65 years |
| 01.10.93 | 64 years |
| 01.10.97 | 63 years |
| 01.03.98 | 62 years |

Around three-quarters of older workers now qualify for AFP pensions, and a large proportion of those who do qualify actually claim them. A particularity of the AFP scheme is that entry into it has almost no impact on the size of the eventual public old-age pension at age 67. The average age at retirement has thus dropped precipitously, reducing output and tax revenues, and raising public spending. From 2005 to 2006 it is expected that the amount

of AFP pensioners will increase by 1600. The rapid increase in the workers, who utilize their AFP pension scheme, will then increase the public pension spending by about NOK 2.9 million. About 13 000 private firms have an AFP agreement with their workers today, which then makes about 500 000 workers in the private sector eligible for the scheme[8].

In addition to the social security pension and early retirement pension, occupational pensions are widespread in Norway. The occupational pension scheme is organized through private insurance companies or special funds. The scheme is pre-funded, and payments to the company or fund are tax deductible. In 2000 about 70 percent[9] of retirees received an occupational pension, and by that adding almost 30 percent to the national insurance scheme. As a rule, old age private pensions are paid after the age of 67 and after 30 years of work. However, all decisions about establishing and design of occupational pension plans are decided within the company itself. Since paying out the occupational pension before the age of 67 means that the tax deduct disappears, the age still becomes important for the firm. Today, occupational pension schemes are compulsory by law. Within 2006[10], all firms must have an occupational pension scheme for its workers, which then will cover a large part of the working population in Norway.

There are many challenges for the pension system in Norway today, and to be able to prepare for these challenges a reform of the system has been outlined. The main challenges for the system is that the scheme will come under increasing pressure as a result of lower growth in the working population, higher average benefits and increased life expectancy amongst retirees. Whilst a 67-year old could on average expect to live for 14 years when the retirement age was reduced to 67 years in 1973, this may increase to 22 years in 2050. In the absence of reforms to the present system, this might result in more than a doubling of the old age pension expenditure of the National Insurance Scheme by 2050 as a share of overall national income, from 6 percent of Mainland Norway GDP in 2003 to 15 percent in 2050. The problems caused by this are reinforced by the fact that the pension system currently does not offer older workers sufficient incentives to continue working, but at the same time offering flexibility on when to retire. The main goals of the outlined reform are that the pension system must secure the future of the National Insurance Scheme, by making the system financially sustainable. In addition is it imperative for the system to stimulate people

[8] Aftenposten 14. juli 2006, http://n24.no/naeringsliv/article1387392.ece
[9] Statistics Norway " Smalhans eller det gode liv" Økonmiske Analyser 2/2005 http://www.ssb.no/emner/05/01/10/inntekt/art_oa.html
[10] http://www.lovdata.no/all/nl-20051221-124.html

to work more. And at last it must continue to ensure that all retirees receive a guaranteed minimum state pension[11].

Household income is the sum of different sources of income, and spouse's income in 2003 fixed prices, after taxes were deducted. It is expected that a fall in income and an increase in pension income will take place in the period investigated. The tax rate on pension income is lower than the tax rate on income. Table 2 shows the different rates.

**Table 2 Marginal tax rates of income above the tax limitation limit and below 12 G (2001).[12]**

Wage $$\tau^w = \begin{cases} 0{,}358 \text{ for } W \leq 289000 \\ 0{,}493 \text{ for } 289000 < W \leq 7932000 \\ 0{,}553 \text{ for } W > 7932000 \end{cases}$$

Pension $$\tau^p = \begin{cases} 0{,}31 \text{ for } P \leq 289000 \\ 0{,}445 \text{ for } 289000 < P \leq 7932000 \\ 0{,}505 \text{ for } P > 7932000 \end{cases}$$

Data files provide information on the **wealth** of each person at the end of the year. Wealth consists of financial wealth coming from bank deposits and stocks, and real wealth which is the value of housing and property.

For several reasons, it became clear that including the value of housing and property complicated the construction of wealth. First of all, it is proven that the tax value of house substantially differ from the market value of houses. According to Statistics Norway[13], the tax value of houses is around 20 percent of the market value. Second of all, housing can be measured as investment, saving, bequest or consumption at the same time. When people buy a house, they consume, but they also invest their money hoping it will increase in value and in that way it is saving for the future. In addition, housing can be bequest since it has value for inheritors, and people might take this into account when they decide how to accumulate wealth. A last reason to exclude real wealth in the analysis was that it became obvious that several adjustments had been made to the tax value due to price increase or decrease. These adjustments could then complicate the construction of saving. These arguments give us an incorrect estimate of wealth, and in the further analysis value of housing is excluded.

[11] A reform of the pension system http://www.pensjonsreform.no/english.asp?id=22#m
[12] Hernæs et al., 2006: The Determinants of Occupational Pensions
[13] Statistics Norway "Dyre boliger har lav ligningstakst" http://www.ssb.no/emner/05/03/sbolig/

Net financial wealth was therefore used for further analysis. Wealth was calculated in fixed 2003 prices, and data for 1998 is included to be able to calculate savings for 1999.

**Saving** is not directly observed in the data used. To construct saving it is necessary to relate yearly changes in household's net financial wealth to household saving. Saving is therefore determined as an increase or a decrease in household's net financial wealth. When saving is determined, **consumption** can be constructed by subtracting saving from after tax income for each year.

# 4. Analyzing households

## 4.1 Income

When investigating income in a transition period such as retirement, it is worth keeping in mind previous research and what one would expect to find. It is expected that there is a reduction in income associated with retirement. The simple life-cycle model predicts a reduction in income with the elderly sustaining the level of consumption by using accumulated wealth. One reason the retired need less after retirement is that they no longer have to pay towards pension schemes. Saving for "retirement" is also unnecessary, and taxes on pension income are lower. Hamermesh (1984) argues that social security benefits and private savings for US households are not sufficient to sustain the consumption level, and that consumption will exceed income. He found that that 54 percent of his sample households have a consumption-income rate greater than 1.1. Statistics Norway[14] investigated welfare levels for different cohorts before and after retirement, and the results were that most of the analyzed cohorts are able to sustain their welfare when, and after, they reached retirement age.

A large part of other research done in this field mostly utilized survey data and it can be difficult to observe directly the real income paths.

In this paper income is fixed in 2003 prices.

Figure 2 gives a picture of the average income before tax for the female headed households. The first striking observation is that income stays constant over the period. Keep in mind that this is income before tax and that marginal tax rates are lower for pension income. This will shift the curve down, and make a kink up in 2001 when the pension income starts from the social security scheme. Figure 3 gives the same picture, but utilizing data of the male headed households. Here also income stays relatively constant, however declining slowly. By calculating after tax income, the curve would flatten out.

A second interesting observation is the path of the components of income. As expected, pension income is increasing rapidly and pension giving income is decreasing rapidly. More interesting are the levels which these two components have. The low level of pension giving income, which is just above NOK 100 000 in 1999 for the female headed

[14] Statistics Norway (2005): "Smalhans eller det gode liv", Økonomiske analyser 2/2005 , http://www.ssb.no/emner/05/01/10/inntekt/art_oa.html

households, gives an indication that a large proportion of these households already are retired, or at least partially out of the labor force. As mentioned earlier, early retirement is on the rise in Norway, and the head of the households analyzed were eligible for early retirement from 1997 when the new reduced age of 63 was introduced. However it is likely that a proportion of them already are partially retired or receiving disability pension.

The levels are slightly higher in Figure 3. Pension giving income is about NOK 200 000 in 1999. In addition, the distance between pension income and pension giving income is less for the male headed households.

**Figure 2. Income before tax. Female headed households**

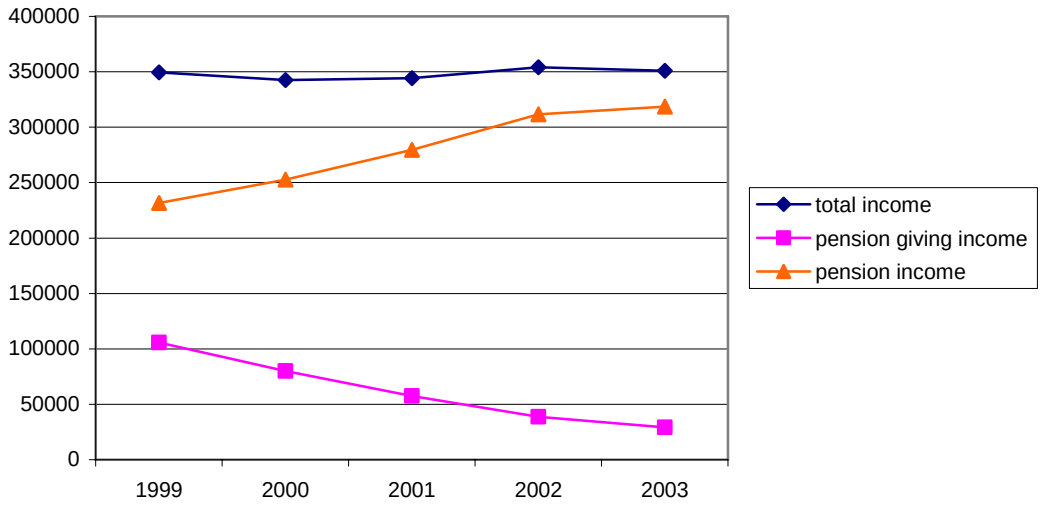
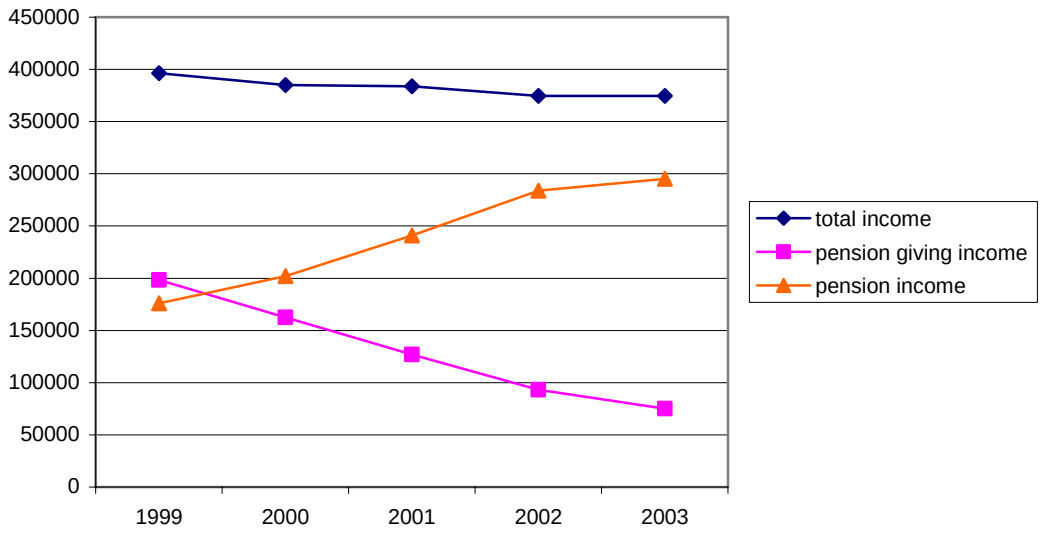



**Figure 3. Income before tax. Male headed households**

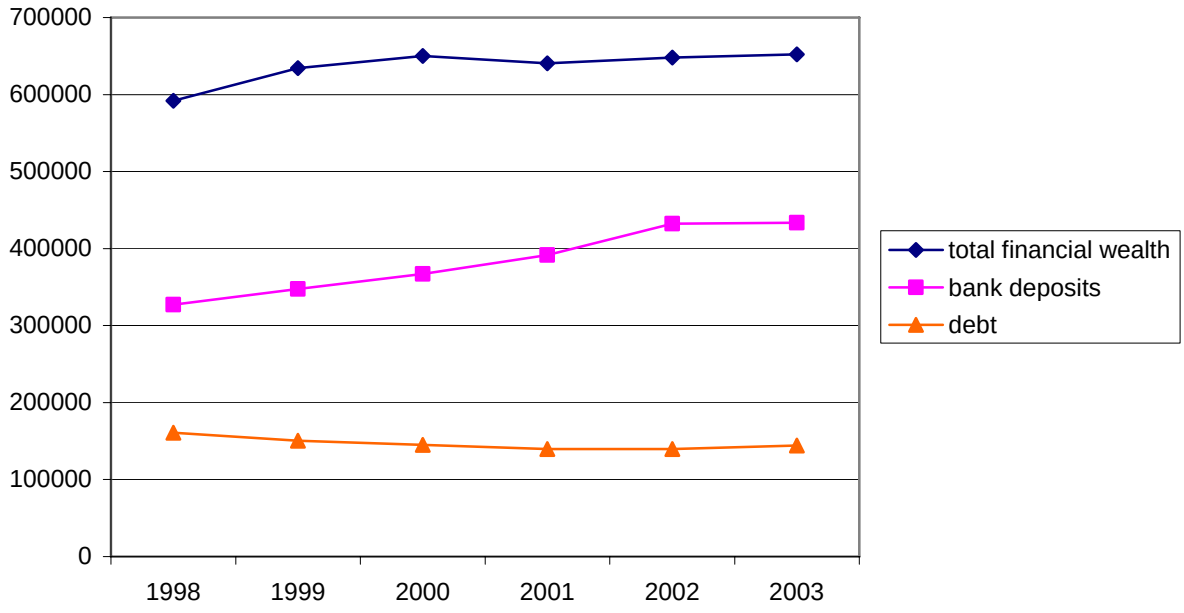


The male headed households have a higher level of income than the female headed households. The higher level can come from the fact that male in general have higher salaries than female, and from the fact that fewer male than female might have retired, since male often retire before female in a household. Therefore the total income should be higher for the male headed households than female headed households. All in all, this indicates that a greater part of the female headed households are retired compared to the other set of households.

One explanation for the stable and high level of total income for the households can be that the basic minimum amount of pensions has increased in the period[15], and that the number of retired receiving the lowest pension is decreasing since more women have started to work instead of being homemakers.

## 4.2 Wealth

**Figure 4. Wealth. Female headed households.**




[15]Statistics Norway Sjølvmeldingsstatistikk for folketrygdpensjonistar, 1998-Betre for minstepensjonistene http://www.ssb.no/emner/05/01/innrtygd/main.html

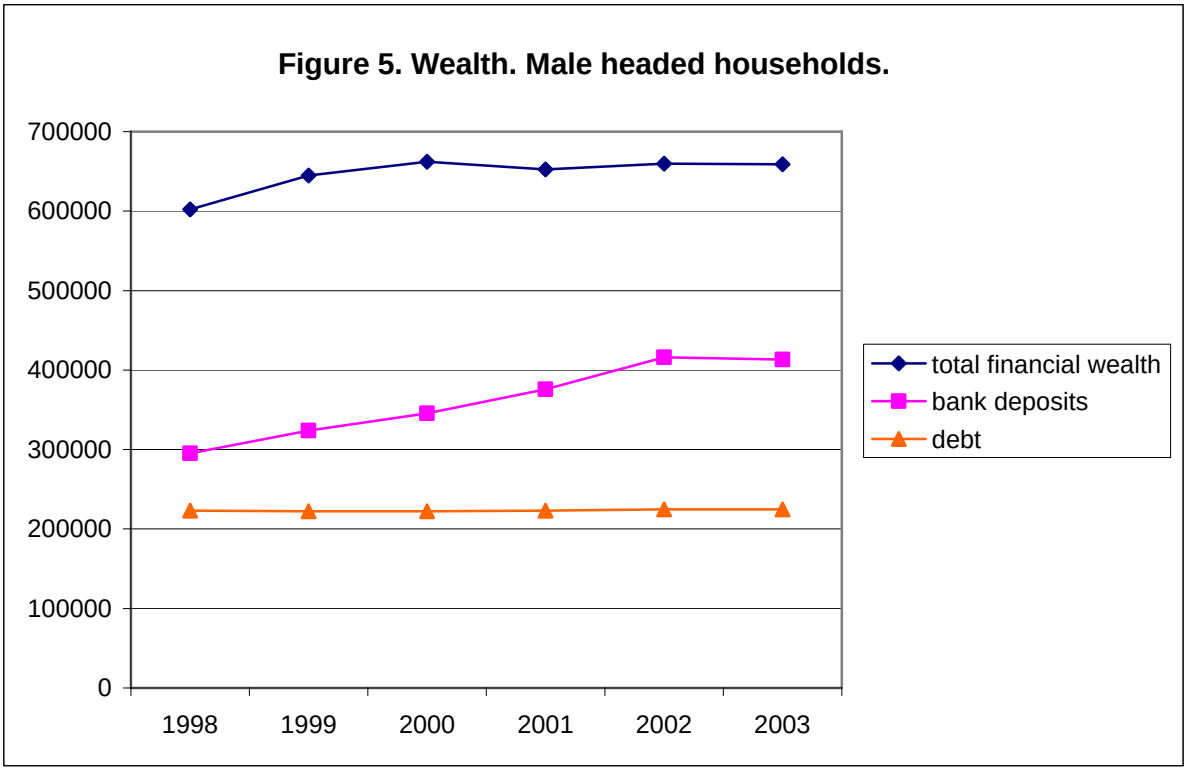



Figure 4 and 5 show wealth accumulation for the households. As one can see, the elderly are well prepared for retirement with a large accumulated wealth. After retirement total financial wealth is increasing, except for one small dip in 2001, and debt is slowly decreasing or almost stable through the period. Most interesting, is the steady increase in bank deposits which shoots up from 2001 to 2002 when retirement age occurs. One reason for the big jump in bank deposits in this period can be the uncertainty in the stock market at this time period, which perhaps made people move money from stocks to saving accounts.

Due to some extremely high values on the financial wealth (maximum value of NOK 98 862 045), constraints were put on extreme observations of wealth to adjust the mean. Households with net financial wealth over NOK 10 000 000 were not included, as well were households with net financial wealth below NOK -10 000 000 excluded. The mean of net financial wealth was reduced by about NOK 100 000, and the two samples were reduced by about 4-5 percent.

The relation between pension and wealth has been discussed in many papers. In the simple life-cycle model, workers save only for retirement, and changing workers' compensation from wages to pension benefits has no effect on consumption. Increases in pension are offset by reductions in other wealth. In real life the relation can vary quite a lot. Hubbard (1986) argues that pensions can provide insurance against uncertainty in life, and

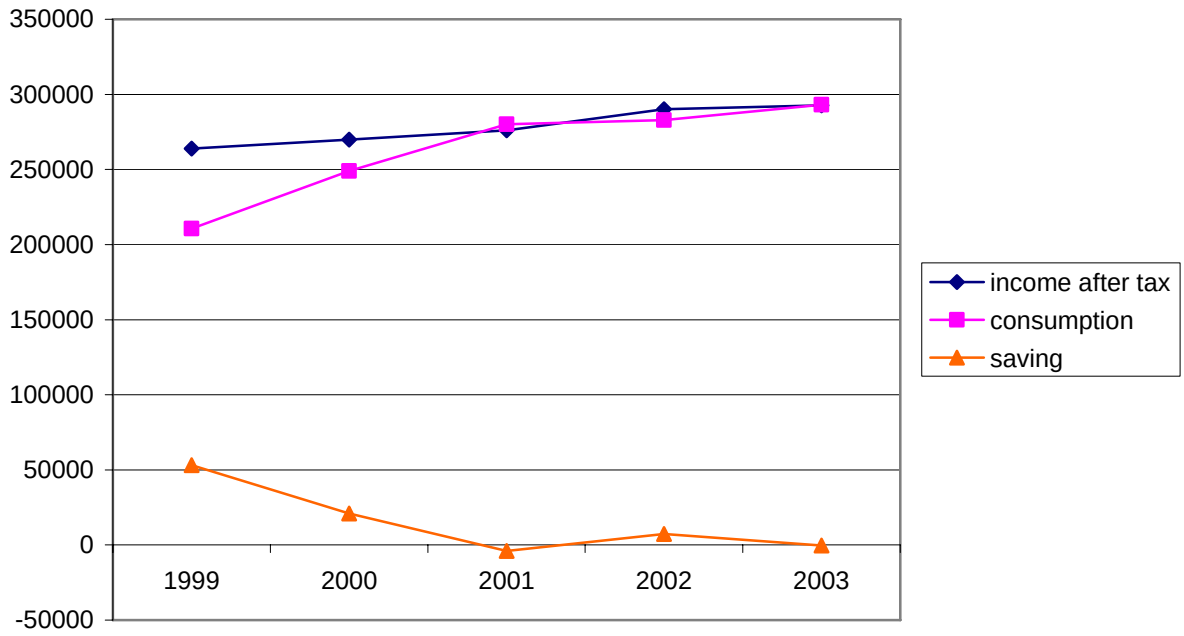
therefore other types of insurance, like wealth accumulation will be reduced. On the other hand, high pensions might induce early retirement, which then could increase wealth (Feldstein 1974). Bernheim (1994) suggests that pensions can raise nonpension wealth. Gale (1998) investigates this issue, and his results supports previous work demonstrating the offset between pensions and wealth. Moreover, these findings suggest that the relation between pensions and wealth could vary, and that the effect of pensions on wealth is ambiguous.

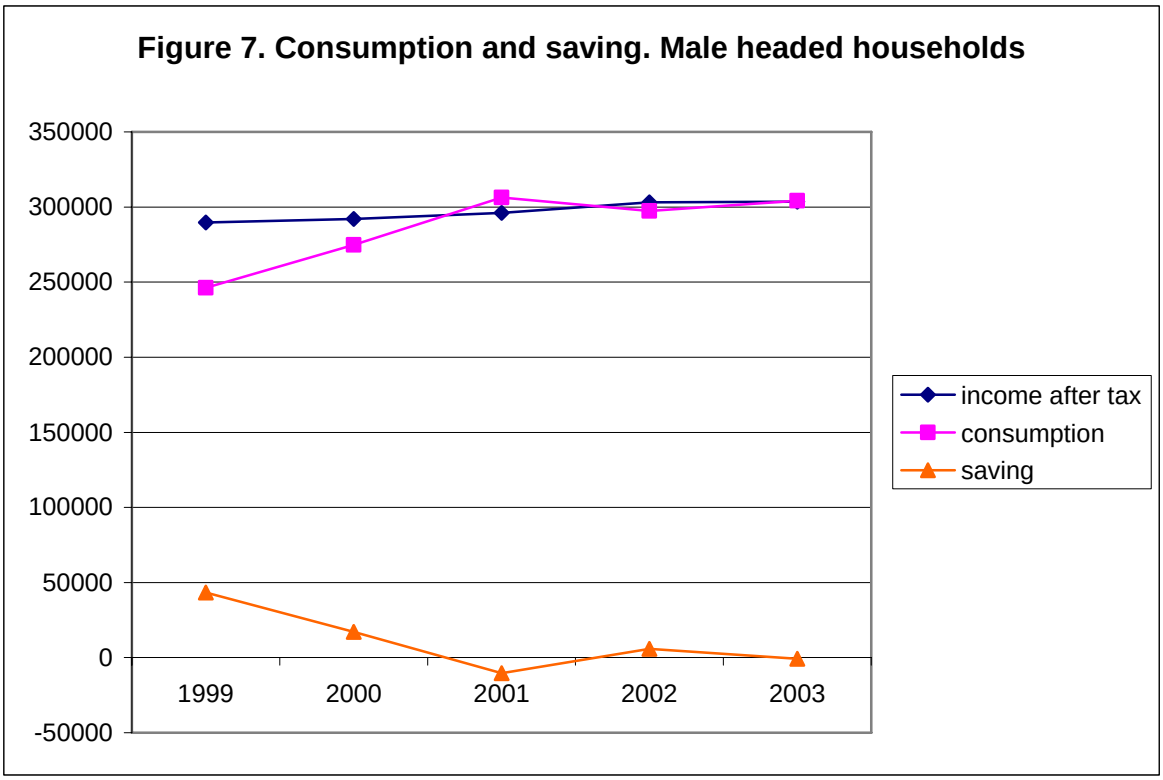
## 4.3 Consumption and Savings

Figure 6 and 7 shows the trends of after tax income, consumption and saving for male headed- and female headed households.

The figures show income after tax, consumption and saving in 2003 prices. As stated earlier, deducting taxes has pushed the income curve downward and kinked it slightly due to the tax rates on pension income. Therefore, income after tax is slowly increasing in the period.

**Figure 6. Consumption and saving. Female headed households**






The first thing to notice from the figures is that there is no smoothing of consumption in the transition period. On the contrary, consumption increases on average for the households. In addition we can see that for both household types, saving dips in 2001, but raises slowly and flattens out after 2001.

A number of papers have investigated saving patterns of the elderly. Two studies[16]done in Norway show that saving increases when people become older, and indicates that the leading motive for saving is not to secure themselves financially for retirement, but rather a combination of precaution- and bequest motive.

From this it is easy to conclude that there is no observed retirement consumption puzzle in Norway for these households. There is no observed drop in consumption as demonstrated by other studies done in other countries. The Standard life-cycle model does not fit with the data for these Norwegian households, since a constant consumption path is not observed.

Schwerdt (2005) finds a drop in consumption for households with low income replacements ratios. He argues that the result can be interpreted in line with the assumption

[16] Statistics Norway (2003), Samfunnsspeilet nr.1, http://www.ssb.no/samfunnsspeilet/200301/06/index.html
Maria Kalvarskaia (2003): "Savings behaviour when households have an access to occupational penions" Memorandum Department of Economics UiO 23/2003.

of forward looking rational decision makers. Individuals do not save for an unanticipated drop in income, because they plan to substitute some consumption with home production given the increase in leisure. However, he also suggest that low income replacement groups engage in home production precisely because of the low income replacement ratio, because the drop in income is larger. We have no measure for home production in our data set, but, on average, consumption increases also among those with low replacement ratios. Hence from the findings in this study, it is tempting to suggest that leisure and consumption are complementary goods since consumption increase when leisure increases at retirement.

## 4.4 Replacement ratios

To further analyze consumption and income for the households, I (as does Schwerdt 2005) introduce the concept of replacement ratios. Replacement ratios are calculated for consumption (CRR) and income (IRR) by dividing the average yearly household income (consumption) two years after retirement by the average income (consumption) before retirement.

(10) $$IRR = \frac{(Y_{t+2} + Y_{t+1})/2}{(Y_{t-2} + Y_{t-1})/2}$$

(11) $$CRR = \frac{(C_{t+2} + C_{t+1})/2}{(C_{t-2} + C_{t-1})/2}$$

**Table 3 Replacement distributions, female headed households**

| | Mean | Median | Standard error | Minimum | Maximum |
|---|---|---|---|---|---|
| CRR | 1,77 | 1,15 | 10,68 | 0,0054 | 619,6 |
| IRR | 1,14 | 1,09 | 0,53 | 0,25 | 31,3 |

**Table 4 Replacement distributions, male headed households**

| | Mean | Median | Standard error | Minimum | Maximum |
|---|---|---|---|---|---|
| CRR | 2,09 | 1,07 | 24,1 | 0,0039 | 1718,7 |
| IRR | 1,22 | 1,06 | 4,95 | 0 | 328,3 |

According to the life cycle model, there should be no consumption change, so the CRR should equal one. As Table 3 show, the mean consumption replacement ratio for the households is 1.77. This means that consumption increases by 77 percent from pre retirement to retirement. This high number can come from some few extreme numbers, such as the highest of 619.6 and 1718.7. The median is less affected by these extreme values.

The aim of constructing these variables is to be able to split the sample into four parts. The split points is the 25, 50 and 75 percentiles (quartiles) values of the income replacement values. The reason for choosing these split points is that the values of the percentiles are less affected by extreme values. When splitting the sample, smaller groups are analyzed, and it is interesting to check if each group has the same consumption change dependent on which income replacement ratio they belong to. To analyze this, I can estimate an econometric model with dummy variables for each income replacement group. Dummy variables are used to capture effects of explanatory variables that can take one or two values, usually 0 or 1. These simple variables are very powerful tools for capturing qualitative characteristics of individuals. Dummy variables for different levels of education are also included to check if education has any effect on consumption change at retirement. Education can either be low, up to ten years of schooling, medium, up to twelve years of schooling, or high, more than twelve years of schooling. For each dummy group (education and income replacement), one dummy variable for each dummy group needs to be omitted to avoid the problem of falling into the dummy variable trap of exact colinearity. One group for education dummies and one group for income replacement dummies are needed to construct the reference variable. Mathematically it does not matter which group is omitted. The coefficients of the dummy variables represent expected differentials relative to the reference group.

Coefficients in the model are estimated by the OLS method. The following equation was estimated

$$\ln(CRR)_i = medu_i\delta_m + hedu_i\delta_h + irr2_i\beta_2 + irr3_i\beta_3 + irr4_i\beta_4 + \varepsilon_i \tag{12}$$

In this equation, households in the lowest education and income replacement categories are the reference group for the analysis. Medu and hedu are the dummies for medium and high education respectively. Irr2, irr3 and irr4 are the dummies for the second lowest-, second highest- and highest replacement ratios respectively.

Income replacement ratios give the effect of the change in income, but not the effect of which level of income a household has. By dividing the households into income quartiles this effect will prevail. Therefore, in addition to equation (12), a similar regression is estimated, but with income quartiles as explanatory dummy variables. The same procedure as over was done, but instead the sample is split by which income quartile they belong to. The average income two years before retirement age was used to compute income quartiles.

$$\ln(CRR)_i = medu_i\delta_m + hedu_i\delta_h + inc2_i\beta_2 + inc3_i\beta_3 + inc4_i\beta_4 + \varepsilon_i \quad (13)$$

As in equation (12) medu and hedu are the same. Inc2, inc3 and inc4 are the dummies for the second lowest-, second highest- and highest- income quartiles respectively.

For these two equations, the deltas will capture the education effect and the betas will capture the effect from which income-or income replacement group the household belongs. The parameter's interpretation is always relative to the reference group, and the intercept represents the effect of the reference group. By using the logarithm of the consumption replacement ratio, the percentage change in consumption in the transition period is the dependent variable in both regressions. For some reasons, some observations had a consumption replacement ratio below zero. The reason for this can come from the construction of saving and consumption. By defining consumption as income net of saving, a saving which is higher than income one year can result in negative consumption that year. To exclude those observations, only households who had a consumption replacement ratio over zero were included in the estimation. The number of observations in the final data set for households with female from the cohort was 8778, and the households with male from the cohort had 9921 observations. The results of the regressions are in table 7, 8, 9 and 10. Table 5 and 6 give an overview of the different quartile groups which are used in the estimation.

**Table 5. Quartiles, female headed households**

| Quartile | IRR | Mean income before retirement |
|---|---|---|
| 1 | 1,02>=IRR | 202071>=inc |
| 2 | 1,09>=IRR>1,02 | 251166>=inc>202071 |
| 3 | 1,22>=IRR>1,09 | 313094>=inc>251166 |
| 4 | IRR>1,22 | inc>313094 |

**Table 6 Quartiles, male headed households**

| Quartile | IRR | Mean income before retirement |
|---|---|---|
| 1 | 0,96>=IRR | 221400>=inc |
| 2 | 1,06>=IRR>0,96 | 280400>=inc>221400 |
| 3 | 1,14>=IRR>1,06 | 347100>=inc>280400 |
| 4 | IRR>1,14 | inc>347100 |

**Table 7 Estimation results of CRR with IRR dummies for female headed households**

| Variable | Estimate | Standard error | T value |
|---|---|---|---|
| Intercept | 0,0761 | 0,0163 | 4,67 |
| Medium education | -0,007009 | 0,0180 | -0,39 |
| High education | 0,0225 | 0,0148 | 1,52 |
| IRR2 | 0,0377 | 0,0184 | 2,04 |
| IRR3 | 0,1096 | 0,0186 | 5,89 |
| IRR4 | 0,2317 | 0,0185 | 12,53 |

**Table 8 Estimation results of CRR with IRR dummies, male headed households**

| Variable | Estimate | Standard error | T value |
|---|---|---|---|
| Intercept | 0,0217 | 0,0156 | 1,40 |
| Medium education | -0,007401 | 0,0147 | -0,50 |
| High education | 0,0127 | 0,0172 | -0,73 |
| IRR2 | 0,0630 | 0,0183 | 3,45 |
| IRR3 | 0,1012 | 0,0183 | 5,52 |
| IRR4 | 0,2542 | 0,0183 | 13,88 |

**Table 9 Estimation results of CRR with income quartile groups as dummies, female headed households**

| Variable | Estimate | Standard error | T value |
|---|---|---|---|
| Intercept | 0,2740 | 0,0149 | 18,34 |
| Medium education | 0,003283 | 0,0182 | 0,18 |
| High education | 0,0805 | 0,0161 | 3,15 |
| Inc2 | -0,1288 | 0,0188 | -6,85 |
| Inc3 | -0,1533 | 0,0193 | -7,96 |
| Inc4 | -0,1764 | 0,0202 | -8,75 |

**Table 10 Estimation results or CRR with income quartile groups as dummies, male headed households**

| Variable | Estimate | Standard error | T value |
|---|---|---|---|
| Intercept | 0,2451 | 0,0144 | 17,06 |
| Medium education | 0,0139 | 0,0150 | 0,92 |
| High education | 0,0448 | 0,0191 | 2,35 |
| Inc2 | -0,1545 | 0,0184 | -8,42 |
| Inc3 | -0,1746 | 0,0186 | -9,37 |
| Inc4 | -0,2315 | 0,0200 | -11,60 |

If the life-cycle model is true, the logarithm of the consumption replacement ratio should be zero, as the consumption replacement ratio should be one. In table 7 and 8, all estimates are significant at a 5 percent level except the estimates for education. The interpretation will then be that education has no influence on consumption change when people retire. The intercept gives us the percentage consumption change for households in the lowest income replacement group with the lowest education level. They have a consumption change of 7.5 and 2 percent for each household type. The other income replacement groups also increase their consumption and the highest income replacement group increase consumption by 23.2 and 25.4 percent relative to the reference group. For households with males from the cohort, the difference is bigger than for households with females from the cohort. It is quite reasonable that households with the low income replacement have the least increase of consumption. Households who experience the largest jump in income are mostly households who before retiring had a relatively low income and

households who experience the smallest jump probably had a relatively high income before retirement. People who experience the largest jump also have the opportunity to have the largest jump in consumption as well. The primary point to note is that in all income replacement groups analyzed, there was an observed increase in consumption.

Table 9 and 10 show the results from the second regression, where all the parameters were significant different from zero, except the parameter of medium education. Having higher education increased consumption relative to having low education and being in the low income quartile. The reference group increased consumption by 27 and 24 percent and the other quartile groups had a lower consumption increase relatively to the lowest group. But all households have a positive consumption change. Households in Table 7 in the highest income quartile group (keep in mind that it is income before retirement age) increased consumption by almost 17 percent less than the lowest group, in other words-they increased consumption by 10 percent. For the households in Table 8, the highest income group increased consumption by 23 percent less than the households in the lowest group, so they increased consumption by only 1 percent. The results in this regression also give us reasonable results; being in the lowest income quartile before retirement, gives the opportunity to increase consumption more than being in the other income quartiles, especially the highest income quartile.

Schwerdt (2005) also found that there was variation between the income replacement groups, but in his analysis the division point was the median replacement ratio. He found an increase in the upper replacement group and a decrease in the lower replacement group. This is similar to what is found here. The difference is that no decrease is found in the samples analyzed here. In addition he did not look at income levels, only replacement ratios.

There is a direct connection between the two regressions. Clearly, the high income replacement households that increase consumption the most in the first regression must to a large degree be the same as the households in the lowest income quartile. A cross group correlation analysis can be done to check if the statement is true.

**Table 11 group correlation, female headed households**

| | INC1 | INC2 | INC3 | INC4 |
|---|---|---|---|---|
| IRR1 | 28 | 227 | 685 | 1255 |
| IRR2 | 83 | 653 | 866 | 595 |
| IRR3 | 530 | 907 | 417 | 331 |
| IRR4 | 1490 | 461 | 224 | 113 |

**Table 12 group correlation, male headed households**

| | INC1 | INC2 | INC3 | INC4 |
|---|---|---|---|---|
| IRR1 | 91 | 394 | 805 | 1194 |
| IRR2 | 247 | 698 | 843 | 680 |
| IRR3 | 685 | 882 | 531 | 373 |
| IRR4 | 1455 | 500 | 295 | 205 |

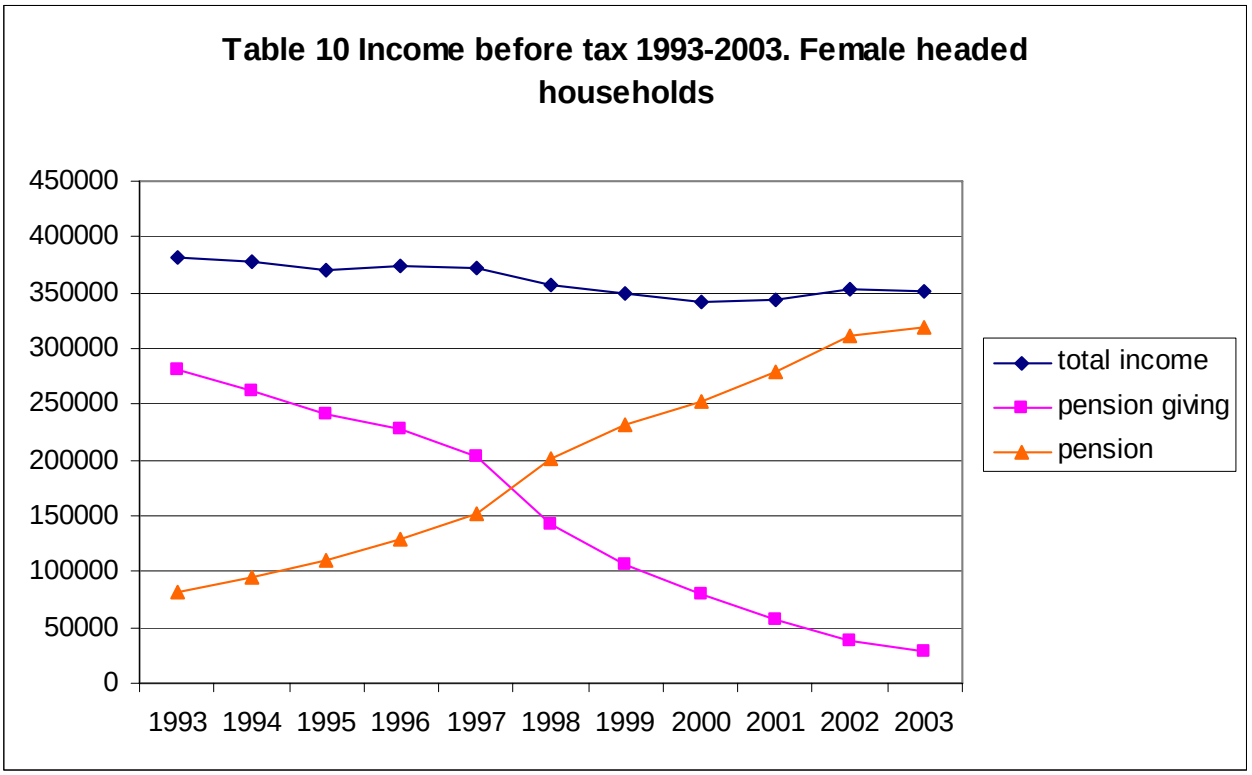
Table 11 shows the correlation between the different groups in the sample with female headed households. For example are 1490 households in the lowest income group and in the highest income replacement ratio group, and only 28 households from the same income group are in the lowest income replacement group. The same can be observed for the sample with male headed households. Clearly there is a high correlation between being in the highest income replacement ratio group and being in the lowest income group. There is also a high correlation between being in the lowest income replacement ratio group and the highest income group. This is because there are most observations in these two groups. The progressive and redistribution side of the national pension scheme prevails in Table 11 and 12 since the households with low income before retirement have the largest increase in income, and the households with high income before retirement have the smallest increase in income. The result of the investigation indicates that it is the level of income a household has two years before retirement which determines the change in consumption. This is because the level of income has an effect on the change in income, and the analysis done here clearly shows that a high income replacement ratio is correlated with a high consumption change. Thus consumption follows income and leisure in retirement, and we have no smoothing.

To further analyze this, the households were split into income quartiles, and the regression with income replacement ratios was estimated for each income quartile group. It is then possible to analyze the effect of being in each income replacement group and consumption change given that you are in a certain income quartile. Because few or almost no significant estimates for education were obtained in the previous regressions, the dummies for education level are not included in future regressions. When running the regression for the data set with female headed households, the results were that for each

income quartile group the highest income replacement ratio group always had the highest consumption change, and the lowest and second lowest income replacement ratio group had the lowest consumption change. There were some insignificant estimates due to few observations in some of the income replacement groups. These results strengthen the suggestion of a consumption path that follows income.

Many questions arise when no income reduction and no consumption reduction is observed for the samples analyzed. Has the income reduction occurred earlier than we expected? Do we need to track income further back to observe a reduction? When do these households actually retire? Retirement is supposed to be a main factor of determining income and consumption according to the life-cycle model and other papers. However, retirement is not a homogenous incident for the population. As argued before, the early retirement scheme has become a solution for an increasing amount of people, in addition a relatively large fraction of the elderly population receives disability pensions which can be looked upon as a substitute for early retirement because very few go back to work after being disabled. These questions give reason for analyzing the households even further and deeper, to be able to find other particularities of the households.

To check if there has been an income reduction earlier, income was tracked back to 1993 for the households. The head of the households were 59 years old in 1993.



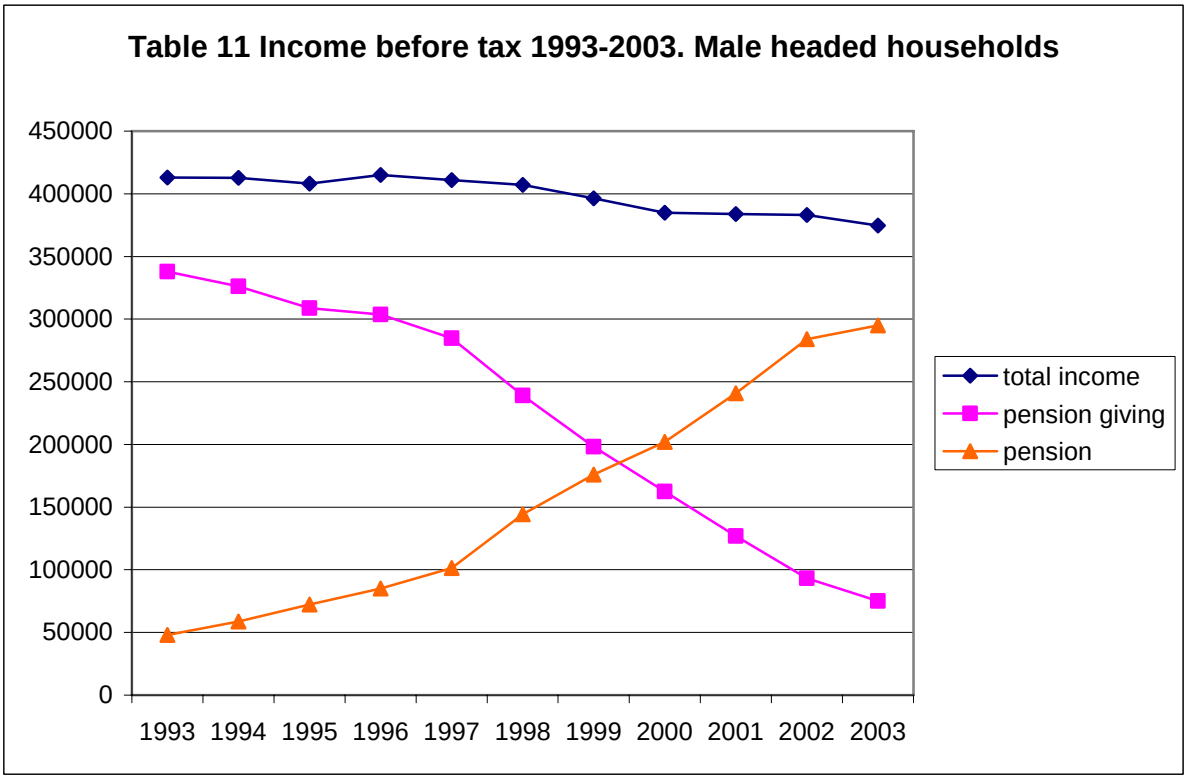



Table 10 and 11 shows income tracked back to 1993 for both sets of households. There is no significant difference between the households, except the level of income. Keep in mind that this is income before tax and, as argued, taxes will flatten the total income curve. By tracking income ten years, we still do not observe a reduction in income at any particular time. Income stays relatively constant while the components are changing rapidly. In 1997, the head of the households could be eligible for the early retirement scheme, since entry age was changed to 63 that year. By looking at pension income, a jump in pension income is observed for both household types which might indicate that a number of households have utilized the early retirement scheme when they were eligible for it. To check for differences in the female- and male income, Table 12 and 13 give a picture to illustrate the components of income. The figures show the components of income (divided by gender) for the female headed households. As argued before, the figures show no particular differences between the genders, except for the levels of income, where male have a higher level of income. As argued before, the observed levels indicate difference in retirement behavior between genders.

**Figure 12 female income before tax 1993-2003. Female headed households**

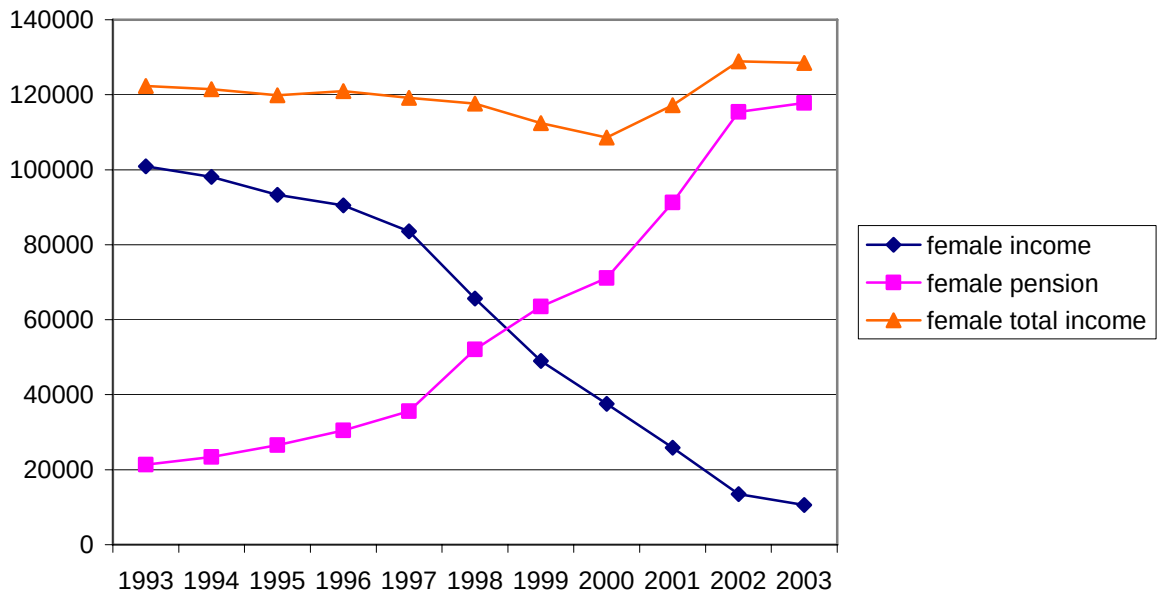
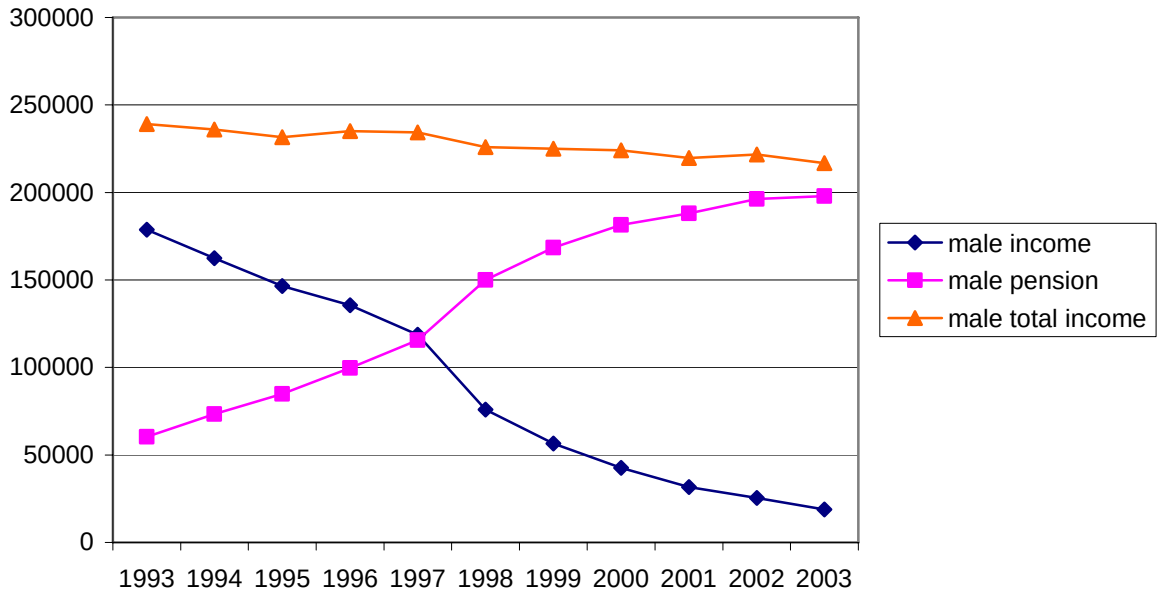



**Figure 13 male income before tax 1993-2003. Female headed households**



So far in the analysis, a retirement age of 67 for the head of the household is implicitly assumed. However, throughout the analysis it has become clearer that it may not be as simple as that. It is of interest to investigate retirement behavior further to be able to perhaps get some more answers. To be able to see when people retire, the pension income and pension giving income is analyzed two years before and two years after 2001. To have a simpler picture, the actual retirement year (2001) is omitted in the analysis since observations in the actual retirement year can be somewhat blurry. Putting different constraints on the pension income and the pension giving income each year for the head of the household gives us several groups of retirement behavior which captures the most realistic behavior of the households. Constraints were such that either pension income was greater than zero, or just equal to zero. The same constraints were put on pension giving income. The head of the household is supposed to retire in 2001 when he/she is 67 years old. Nine groups were constructed, and Table 13 gives an overview of them. Table 14 and 15 gives the frequency for each group.

**Table 13, groups of retirement behavior based on income composition**

| Group | 1999, age 65 | 2000, age 66 | 2002, age 68 | 2003, age 69 |
|---|---|---|---|---|
| 1 | work | work | work+pension | work+pension |
| 2 | work | work | work+pension | pension |
| 3 | work | work | pension | pension |
| 4 | work | pension | pension | pension |
| 5 | work+pension | work+pension | work+pension | work+pension |
| 6 | work+pension | work+pension | work+pension | pension |
| 7 | work+pension | work+pension | pension | pension |
| 8 | work+pension | pension | pension | pension |
| 9 | pension | pension | pension | pension |

**Table 14, frequencies for retirement groups, female headed household**

| Group | Frequency | Percent |
|---|---|---|
| 1 | 690 | 6,97 |
| 2 | 463 | 4,68 |
| 3 | 326 | 3,29 |
| 4 | 5 | 0,05 |
| 5 | 829 | 8,38 |
| 6 | 256 | 2,59 |
| 7 | 701 | 7,08 |
| 8 | 616 | 6,22 |
| 9 | 3438 | 34,73 |
| other | 2574 | 26,01 |

**Table 15, frequencies for retirement groups, male headed household**

| Group | Frequency | Percent |
|---|---|---|
| 1 | 782 | 7,39 |
| 2 | 411 | 3,88 |
| 3 | 219 | 2,07 |
| 4 | 6 | 0,06 |
| 5 | 1685 | 15,92 |
| 6 | 463 | 4,37 |
| 7 | 1014 | 9,58 |
| 8 | 769 | 7,26 |
| 9 | 3188 | 30,12 |
| other | 2048 | 19,35 |

The first thing to notice is that 19 and 26 percent of the households did not fall into any of the constructed groups. The retirement behavior of these households is not identified further, and most likely they fall inn under a combination of the constructed retirement groups. The second point is that the largest group in both household groups receives only pension income throughout the period, no pension giving income is earned, and they are in group 9. Most likely they are receiving disability pension or they have utilized the early retirement scheme. It is not possible to investigate further the sources of pension income, so finding out what kind of pension which is received has not been done. Before constructing the groups, in the previous analysis it was expected that that the head of the households worked full time until 2001 when they were 67 years old, and then retired. This behavior would then fall inn under group 3. In both household types, this group counts for less than 3.5 percent of the total sample. The biggest groups are the ones where the head of the household is combining work and pension or only receiving pension. The point is that few people are working full time until the official retirement age. Most people are partially or fully retired before 67, and a significant amount of the households are probably receiving pension throughout the whole period, some receiving disability pension and some are early retired.

The result of investigating retirement behavior does not contradict elderly behavior investigated by others. According to an analysis done by Statistics Norway[17], the labor participation rate is falling for the elderly population. They analyzed different cohorts, and the aim was to investigate labor participation and the use of social insurance for the elderly population for the different cohorts. Statistics Norway found that the labor participation rate was 54 percent for male 60-66 year olds in 1998, and for a cohort with the same age in 1980, it was 48 percent. For female there has been a small increase in the participation rate. All in all, the rate is decreasing since there are more male than female working. In the same analysis they investigated behavior of people from the 1931 and 1932 cohort. They looked at difference in behavior from 1992 to 1997. One result was that the percentage who received disability pension increased by 12 percent. They also found a 30 percent reduction in the labor participation from 50 percent when they were 61years old to 20 percent when they were 66 years old.

When having grouped the households in different retirement behavior, it can be of interest to find out if being in one particular group has an effect on the change in

[17] Statistics Norway ”Eldre i Norge” Statistiske analyser nr. 32 http://www.ssb.no/emner/00/02/sa32/

consumption. By including the different retirement groups as additional dummies in regressions (12) and (13), one can check for this effect. The first group was included in the reference variable. The estimation was done with few significant values on the parameters for retirement groups as a result. The parameters for the income groups and income replacement groups were still significant. By running the regressions within each retirement group also very few significant estimates were obtained. This might give us an indication of that retirement behavior is not important for people when they make decisions about saving and consumption at retirement. The decisions are made independent of when people desire to retire. The fact that people are able to sustain their high income and the level of consumption might explain that retirement becomes less important in the decision making for households.

# 5. Conclusion

In this paper I have investigated income-, consumption- and savings trends for retirement age Norwegian households. The aim of the investigation was to find some indication of welfare of elderly, but also to test the predictions of the life-cycle model. The main variables which are analyzed are pension income, pension giving income and net financial wealth. By utilizing these variables, saving and consumption is constructed and defined. Saving will be changes in net financial wealth and consumption will then be income after tax net of savings.

The empirical analysis was done for two sets of households, with each household having either a man or a woman from the 1934 cohort. By tracking the households from 1999 to 2003, it was possible to track them two years before and two years after they reached the official retirement age in Norway, which is 67 years.

After analyzing the households it is clear that both sets of households are on average able to sustain their income and consumption throughout the retirement transition period. For both household types, a small increase in after tax income is observed. In addition, there is no observed drop in consumption, quite the contrary is consumption increasing more than income increase. The households have a relatively high level of financial wealth, and the level of debt is low.

By splitting the sample into income replacement groups and income quartile groups, a regression model is estimated to find the effect of different income replacement ratios and income levels on consumption change. The results show that independent of income replacement and income level there is a consumption increase, but there is a variation in how much consumption is increased. The analysis indicates that high income replacement groups increase consumption much more than low income replacement groups do. In addition, there is variation between the income quartile groups. Being in the highest income quartile (by using average income two years before 2001) gave a lower consumption change compared to being in the low income quartile. These results are comparable to Schwerdt (2005).

Further, by checking for correlation between different income replacement groups and income quartiles, I found that being in the highest income replacement groups was correlated with being in the lowest income quartile. Similarly, the lowest income replacement group was correlated with the high income quartile group. Since the

consumption change was positive for the whole sample but highest for the group with the highest income replacement ratio, this indicates that consumption to a high degree follows income, and can not be determined by the life- cycle model. The life cycle model predicts a smoothed consumption path which is constant over the span of life. In this analysis I have found a consumption path which follows income and in addition increases around the age of 67.

It is a well known fact that the retirement age in Norway is decreasing, and varying a lot within the retiring population. Therefore it could be that the drop in income might have occurred earlier than assumed. By tracking income as far back as 1993 it was clear that no income drop was observed in this ten year period. Income stayed relatively flat throughout the period. However pension income and pension giving income were increasing and decreasing respectively. In addition; a relatively low level of pension giving income suggested that retirement behavior should be investigated. The households were grouped into ten different retirement behavior groups, and the results showed that less then 3.5 percent worked full time until they were 67 years old and then retired. The majority of the households were retired earlier or receiving disability pension.

The analysis show that for the sets of households, income and consumption increase in this period. The increase in consumption can suggest that leisure and consumption are complementary since leisure increase associated with retirement coincides with consumption increase. It is also shown that income level and degree of income replacement determined the amount of change in consumption. The behavior can not be explained by the utilized life-cycle model since consumption smoothing is not observed. No retirement-consumption puzzle is observed for the analyzed households.

Since a significant amount of the households utilized the early retirement scheme and still were able to sustain the level of income and consumption, it might suggest that retirement is less important in the decision making of households since they are able to sustain the level of income an and consumption after they have retired.

The model utilized is the life cycle model. This model gives a basic framework for analyzing the households. It is assumed that the discount rate and the interest are equal, to make the analysis simple. Therefore; absences of these factors contribute to the results found in this paper.

The results of the analysis are meaningful and significant and could be followed up in future research, in several directions. By analyzing more than one cohort, one can achieve more comparable results with changes over time. In addition, an older cohort could be

analyzed to be able to follow the households further in to their retirement life. It is also possible to use a more complicated version of the life-cycle model which includes uncertainty and this could contribute to other results. The number of children in households might have an affect in the decision making, since people think about future generations when they make decisions about saving and consumption.

Further analysis can improve the results and interpretations found in this analysis. The current paper can however be considered as a contribution to the analysis of consumption and savings behavior of retirement age households, within the life-cycle model framework.

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